

How to Build a Lazy Susan/Turntable at SILab



OBJECTIVE:

Traditionally, Lazy Susans or turntables are round or tray shaped platforms that can hold food items, spices, etc. and rotate on a set of bearings to make items easily accessible on both counter/tabletops or in storage. At SILAB, we've found a new and easy way to recreate this generally expensive but multipurpose kitchen/office item by recycling old compact discs! Turntables can also be a great way to organize any workspace or create a rotating display surface for a laptop or tablet.

MATERIALS:

- WOOD GLUE
- CLAMPS
- OLD CDs (COMPACT DISKS, DVDs, ETC.)
- POPSICLE STICKS/PAPER CUP/PAINTBRUSH
- RUBBER/NON-SLIP SHEET
- MEASURING TOOLS (RULERS, CALIPERS, ETC.)
- WOOD BLOCKS OF ANY PREFERRED SIZE
- HOT GLUE
- SANDPAPER
- FOOD GRADE MINERAL OIL
- FASTENERS:
 - ONE LARGE BOLT, NUT, WASHER
- WRENCH
- X-ACTO KNIFE/BLADE/SCISSORS

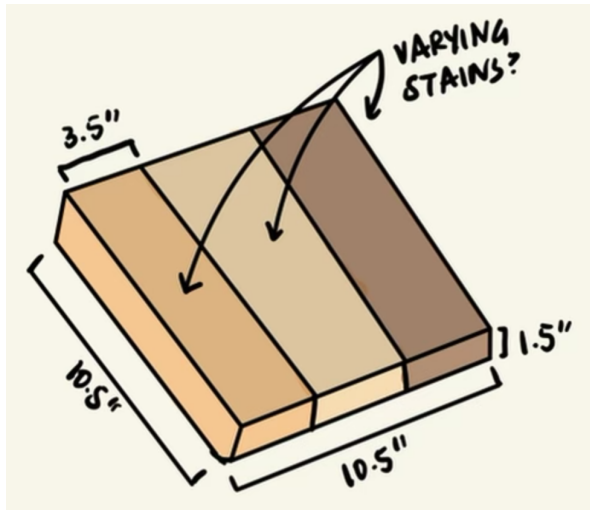
PROCESS:

TOOLS:

- BANDSAW
- BELT SANDER
- ORBITAL SANDER
 - ORBITAL SANDER PADS OF VARYING GRITS: ~150-180
- DRILL PRESS/POWER DRILL
 - DRILL BITS
- PLANER/HAND PLANER/JOINTER

DESIGNING YOUR TURNTABLE SURFACE

- Start with a simple sketch of the surface of your turntable, with details regarding the dimensions of the piece (length, width, thickness).
- For a beginner project, it may be best to stick with square geometries, as circular or more complex surface shapes may call for the use of more involved equipment such as the NC milling machine. But choose whatever shape is the best fit for your skill level, interest, and time commitment! Staff at SILAB will always be willing to help!



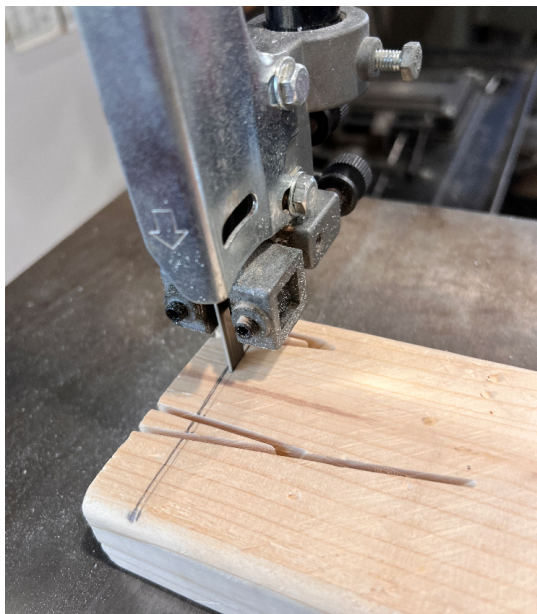
The image to the left is a sample rough sketch detailing dimensions (10.5"x10.5"x1.5") of the turntable surface with 3 individual wood panels (10.5"x3.5"x1.5") as well as potential creative choices such as wood staining, cut geometry, etc.

ASSEMBLING TURNTABLE SURFACE

- Turntables can be made from a variety of materials (acrylic, metals, ceramic, wood, etc.), but generally, the easiest to work with, especially with the resources available in SILAB would be wood. Wood is generally a very forgiving material and can easily be shaped, stained, and sanded how you desire.
- The first step is to choose the material you will be working with. Get creative with this! If you cannot find a piece of wood large enough for your desired surface dimensions, don't worry! You can easily cut, sand, and glue available materials together to achieve your desired size. This will often make for an even more aesthetically pleasing or interesting end product anyways!
 - It's best to choose stock pieces of similar thicknesses, to make for a more even surface.
- Once you've chosen the workpieces for your surface, use a ruler or measuring tool to mark the desired lengths of each piece (this is only necessary if the chosen stock is not already of your desired dimensions).



- Using the bandsaw, cut your workpieces to the lines you have marked. Sand off cut surfaces using sandpaper or the bandsaw, if necessary.



- If the surface of your stock is very rough or has lots of irregularities, it is advisable to use either the planer or jointer before joining the individual parts together.



In the image to the left, I used the jointer to smooth the various surfaces of each of my stock pieces.



I then used the belt sander shown to the left, to smooth off rough edges or corners. An optional step is to save chips or sanded off material in a paper cup, as it can act as a filler for any cracks in the wood!

- If you are joining various pieces of stock together to make your surface, use wood glue on the appropriate surfaces to join together the stock and clamp the assembly together using the adjustable quick grip clamps and leave the assembled stock to dry overnight or for a few hours before moving to the next step.



I've included my chosen wood assembly below (different from that included in the steps above). I patterned long thin pieces of two types of wood (total of 8 individual panels) and glued them together using wood glue and clamped the whole assembly to dry overnight, similarly to the process used for the first design shown.



REFINING/FINISHING TURNTABLE SURFACE

- After assembling the stock pieces together, an important step is finishing the wood to: remove irregularities, achieve an even and smooth surface finish, and achieve your desired stock color!
- *Optional step:* If there are lots of visible gaps between the pieces of stock you have glued together, use chips or sanded off saved material in a paper cup, mix with wood glue, and use a popsicle stick (or something similar) to fill the gaps in! This is a great recipe for a makeshift wood filler, as it will be a perfect color match to your wood.



- After the gaps have been filled and this material has dried, sand off any excess filler on the surface.
- You can use the planer or jointer to do this but if your assembled turntable surface is too large for either of those machines, you can use a hand planer, as shown below:



- This tool takes some getting used to, but once you have set the blade height as needed and have figured how much pressure to apply, you can remove large shavings of the wood relatively easily. You might have to do many repetitions of smooth and straight “strokes” up the wood to get the desired finish.
- Be sure to clamp the wood down to a surface before planing to keep it in place and give you more leverage.
- You can follow up this process with hand sanding, or by using an orbital sander. Start with a low grit sanding disc and switch to higher grits in increments. This will ensure the best surface finish.
 - Keep in mind that the amount of sanding and the optimal grit levels to apply to the workpiece depends on the quality and hardness of the wood you are working with. These powerful tools can easily gouge your material if you don’t monitor the amount of pressure you apply to the sander while sanding.
 - Generally, 150-180 grit is used for finishing woodworking, so I would stay within or close to that range.
 - My design uses very hard wood so I needed to use a variety of grits and increased grit in small increments.
 - Pay close attention to how your wood is reacting to various pressure levels and grits, and adjust accordingly.



- After sanding to your desired finish, you can add the mineral oil pictured below to your sanded surface using a paper towel.
 - Adding mineral oil can not only help protect your wood from warping and cracking in response to humidity changes, but it can also help enhance the overall aesthetic of the workpiece by adding volume to the wood's natural grain pattern and amplifying the wood's natural color.
 - The mineral oil that you will find at SILAB is food safe which makes it perfect for potential uses you will have for your lazy susan!
 - You will notice an almost immediate difference in the vibrancy of the wood after applying the wood. Make sure not to use too much, as this can make the surface difficult to work with afterwards.



CREATING THE PIVOT

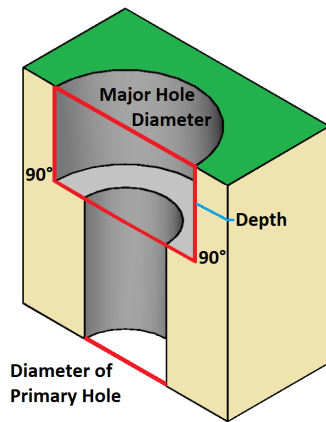
- After finishing the surface of the turntable, there are some quick steps you can take to attach a mechanism that will allow the turntable to smoothly spin on any flat surface.
- Locate the perfect center of your surface using measuring tools and a pencil.
 - You can find the center by measuring both the length and width dimensions of your work piece and marking the halfway point of both sides. Then project a line of both marks by drawing straight across to the opposite side (lengthwise and widthwise). The intersection of these two lines at the center of the workpiece will be your perfect center!
 - I made any needed marks on the unfinished or intended “bottom” surface of my turntable, but this is not necessary, as you will drill your hole all the way through (unless your wood is thick enough that you don’t need to!)



- You will then create a counterbored hole by using two different drill bits. One drill bit must be the size of the diameter of the head of the bolt you choose to use, while the other drill bit must match the diameter of the threaded portion or shank of your bolt. *For my chosen fastener, the head size was 15/32, and the shank size was 5/16.*
 - Choose a screw with a shank that fits well (not too tightly) into the center hole of your two CDs. The screw will serve as a pivot point for the rotating CDs.



- Using either a drill press or a power drill, drill a hole with the larger chosen bit into the top of the turntable surface. Don't drill all the way through, but about halfway through the thickness of the workpiece.
 - Before drilling, make sure your surface is clamped down and secured as needed.
- Next, flip your surface over, and use the smaller chosen bit to drill into the bottom of the turntable surface. You can drill all the way through this time! And you've made a counterbored hole!



Counterbore

The larger hole is drilled straight into the material at a shallower depth than the smaller inner shaft. This leaves a flat bottom for the fastener to rest on.

Image Source: <https://www.ablcircuits.co.uk/blog/pcb-hole-types-counterbore-countersink/>

- Make sure the screw/bolt comfortably fits in your workpiece. The head of the bolt should be flush with the top surface of the turntable, while the shank sticks out the bottom surface of the turntable.



- Now, using an adhesive (hot glue, super glue), attach the painted or decorated side of one of the CDs to the bottom surface of the turntable. Ensure that you have properly centered the drilled hole within the CDs center hole.



- Once the CD has bonded to the bottom surface of the turntable, the first component of the turntable is complete! All that's left to do is create the base within which the turntable will rotate.

CREATING THE BASE

- Find a nut that comfortably fits on your selected bolt. The outer diameter of the bolt and the nut should also fit in the center hole of the CD. For example, in the picture below, I used a bolt with a 5/16" shaft diameter and a 15/32" head diameter, and a nut with a 5/16" inner diameter.



- Find another piece of wood that is around the size of the CD on its surface. Follow the steps from the first section (*Assembling Turntable Surface*) of these instructions to cut

the chosen wood stock down to the appropriate dimensions for the base of this project, if necessary.



- Place the chosen nut at the center of the wood stock (base). Trace a circle around the nut to indicate how large of a hole you need to drill. *For my chosen fastener, the diameter was ~.50", therefore requiring a 1/2" drill bit.*
- Using either the drill press or a power drill, drill out the hole that will hold the nut.
 - Ensure that you have clamped your stock down before drilling.
 - Do not drill all the way through your stock, but to a depth that matches the thickness of the nut. *For my chosen fastener, this thickness was ~.25".*
 - Consider drilling the nesting hole to a diameter that is slightly smaller than the nut's outer diameter, and then using either the arbor press or a hammer to force the nut in. This can be a little tricky, but if you feel equipped and comfortable doing this, it can be a handy way to ensure snug fit.
 - An alternative is to use some sort of adhesive (e.g. superglue) along the walls of the nesting hole and placing the nut in afterwards, to ensure it doesn't shift or move out of the hole.
- After drilling the nesting hole for your nut, place the nut in. It should be a snug fit that ensures the nut will not move out of place with any applied load or torque.



- Next, to finish the bottom of the base, we can attach a non-slip rubber material using adhesives. This non-slip rubber material can be found in the “Plastics” section of the drawer labeled “Random” of the right side blue materials cabinet in the front of the lab.
- Lay the base stock on the rubber sheet, trace out the base dimensions and then use a blade or x-acto knife to cut out the shape.



- Clean off any dust or debris on the surface of the rubber and then wood glue the cut-out rubber to the bottom of the base.



- Now flip the base over, and glue the colored or labeled surface of the CD to the top surface of the base, around the nut.



FINAL ASSEMBLY

- Finally, both the surface of the turntable and the base have been completed. All that's left to do is to put them together! Orient the top surface so that the screw is facing

downwards parallel to the nut in the base. Screw the bolt into the nut by spinning the base on to the shaft of the bolt.



- The photo above shows a side view of the final assembly, with the base flush to the top surface, sandwiching both the CDs together. This way, the top surface can rotate smoothly when the base is on any flat surface.
- Congrats! You have completed your simple turntable/lazy susan construction in SILAB!